500W Series

Instructions for Continued Airworthiness

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Record of Revision

Rev.	Date	Description of Change
1	10-19-06	Initial Release
A	11-03-06	Revision for STC Issuance
B	07-30-09	Add the "-D" to STC number when reissued under ODA
C	02-28-13	Revise to support software version 5.02. Clarify inspections. Add electrical bonding check.
D	11-20-14	Revise to support software version 5.20 with Flight Stream 210

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1. INTRODUCTION

1.1 PURPOSE

This document is designed for use by the installing agency of the Garmin Model 500W series GPS/WAAS Nav/Com as Instructions for Continued Airworthiness in response to Federal Aviation regulation (FAR) Part 23.1529, and Part 23 Appendix G. The ICA includes information required by the operator to adequately maintain the Garmin Models 500W series installed under Approved Model List (AML) STC SA01933LA-D.

1.2 Scope

This document identifies the Instruction for Continued Airworthiness for the modification of the aircraft for installation of the Garmin Models 500W series GPS/WAAS Nav/Com installed under Approved Model List (AML) STC SA01933LA-D. This includes the optional accessory to the GNS 500W, the Flight Stream 210.

1.3 Document Control

This document shall be released, archived, and controlled in accordance with the Garmin document control system. When this document is revised, refer to Section 2.15 for information on how to gain FAA acceptance or approval and how to notify customers of changes.

1.4 Airworthiness Limitations Section

There are no additional Airworthiness Limitations as defined in 14 CFR § 23, Appendix G. G23.4 that result from this modification.

The Airworthiness Limitations section is FAA approved and specifies maintenance required under §43.16 and §91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

FAA APPROVED

Michael Warren
ODA STC Unit Administrator
ODA-240087-CE

20-NOV-2014
Date

1.5 Permission to Use Certain Documents

Permission is granted to any corporation or person applying for approval of a Garmin Model 500W series to use and reference appropriate STC documents to accomplish the Instructions for Continued Airworthiness and show compliance with STC engineering data. This permission does not construe suitability of the documents. It is the responsibility of the applicant to determine the suitability of the documents for the ICA.

1.6 Definitions

The following terminology is used within this document:

1) **AC:** Advisory Circular
2) **ACO:** Aircraft Certification Office
3) **AEG:** Aircraft Evaluation Group
4) **BIT:** Built In Test
5) **CFR:** Code of Federal Regulations

6) **DER:** Designated Engineering Representative
7) **FAA:** Federal Aviation Administration
8) **IAW:** In Accordance With
9) **ICA:** Instructions for Continued Airworthiness
10) **MFD:** Multi-Function Display unit
11) **ODA:** Organization Designation Authorization
12) **PED:** Portable Electronic Device
13) **PMI:** Primary Manufacturing Inspector
14) **POI:** Primary Operations Inspector
15) **STC:** Supplemental Type Certificate
16) **TC:** Type Certification or Type Certificate
17) **TSO:** Technical Standard Order

2. INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

2.1 Introduction

Content, Scope, Purpose and Arrangement:	This document identifies the Instructions for Continued Airworthiness for the modification of the aircraft by installation of the Garmin Models 500W series GPS/WAAS NAV/COM.
Applicability:	Applies to aircraft altered by installation of the Garmin Models 500W series GPS/WAAS NAV/COM.
Definition of Abbreviations:	See Section 1.6
Precautions:	None
Units of measurement:	None
Referenced publications:	190-00357-02 Rev. K *500W Series Installation Manual* or later revision 005-C0221-01 Rev. J *500W Series STC Master Data List* or later revision
Retention:	This document, or the information contained within, will be included in the aircraft's permanent records.

2.2 Description of Alteration

The Garmin Model 500W Series GPS/WAAS Nav/Com unit is a 6 ¼ inch wide panel mounted unit with all the interface connections behind the instrument panel. Installation of the Garmin Model 500W series GPS/WAAS Nav/Com system interfaces, specific for the aircraft installation, is documented in the GNS 500W Series Post-Installation Checkout Log that is retained as part of the aircraft's permanent records. The 500W series units combine a large number of easily acceptable controls to use the color multi-function display, Nav and Com transceiver, GPS/WAAS navigator in a single unit.

The Flight Stream 210 brings Bluetooth connectivity to the cockpit, allowing portable electronics to stream data to and from the installed avionics.

The Flight Stream 210 interfaces to the GNS 500W via RS-232. The Flight Stream 210 may also interface to the GDL 88 through RS-422 and the GDL 69 through RS-232. The Flight Stream unit is a remote mount LRU that may be located in a variety of places around the aircraft. The suggested locations are in the cabin/cockpit area, or in the forward or aft avionics bay. See Section 3.10 in the 500W Series Installation Manual, 190-00357-02 for suggested locations and mounting information.

2.3 Control, Operating Information

See the 500W Series Installation Manual, listed under the reference documentation in paragraph 2.1 of this document, for system operation and self-test information.

2.4 Servicing Information

None. In the event of system failure, return the unit to the manufacturer or an approved Garmin repair station.

2.5 Periodic Maintenance Instructions

The 500W Series units are designed to detect internal failure. A thorough self-test is executed automatically upon application of power to the units, and built-in test is continuously executed. Detected errors are indicated on the equipment via failure annunciations and maintenance is on-condition.

Operation of the 500W Series unit is not permitted unless an inspection as described in this section has been completed within the preceding 12 calendar months. Conduct a visual inspection on the 500W series unit, its wire harness, and the Flight Stream 210 (if installed) to insure installation integrity:

1. Inspect the 500W and Flight Stream units for security of attachment. If the Flight Stream 210 is installed and the screws are not securely attached, tighten any loose Flight Stream 210 mounting screws as necessary to snug plus ¼ turn. If required, re-torque bonding strap hardware for Flight Stream 210 to 12-15 in-lbs.

CAUTION
Care should be taken when tightening to the mounting screws of the Flight Stream 210. Excessive tightening may damage the mounting flange.

2. Inspect for signs of corrosion.

3. Inspect all knobs and buttons for legibility.

4. Inspect condition of wiring, shield terminations, routing and attachment/clamping.

5. Inspect electrical bonding components. Perform bonding check, if due (see Section 2.5.4).

2.5.1 Cleaning the Front Panel

The front bezel, keypad, and display can be cleaned with a soft cotton cloth dampened with clean water. DO NOT use any chemical-cleaning agents. Care should be taken to avoid scratching the surface of the display.

2.5.2 Display Backlight

The display backlight lamp is rated by the manufacturer as having a usable life of 20,000 hours. This life may be more or less than the rated time depending on the operating conditions of the 500W series unit. Over time, the backlight lamp may dim and the display may not perform as well in direct sunlight conditions. The user must determine by observation when the display brightness is not suitable for its intended use. Contact the Garmin factory repair station when the backlight lamp requires service.

2.5.3 Battery Replacement

The 500W series has an internal keep-alive battery that will last about 10 years. The battery is used for GPS system information. Regular planned replacement is not necessary. The 500W series will display a 'low battery' message when replacement is required. Once the low battery message is displayed, the battery should be replaced within 1 to 2 months.

If the battery is not replaced and becomes totally discharged, the 500W series unit will remain fully operational, but the GPS signal acquisition time may be increased. This acquisition time can be reduced by entering a new seed position each time the unit is powered on. There is no loss of function or accuracy of the 500W series unit with a dead battery.

The battery must be replaced by the Garmin factory repair station or factory authorized repair station.

2.5.4 Bonding Check (IFR-certified aircraft only)

Every 2000 flight hours or ten (10) years, whichever is first, perform an electrical bonding check on the GNS 500W Series Unit and if installed, the Flight Stream 210. If a bonding check was not done during the initial installation, it must be done to support electromagnetic interference and lightning compliance.

2.5.4.1 GNS 500W Series Unit in Metallic or Tube/Fabric Aircraft

Perform an electrical bonding check as follows:

1. Remove the 500W unit from the mounting rack.
2. Remove the backplate assembly from the rack.
3. Measure the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure and verify it is less than 10 milliohms.

In the event of bonding test failure, remove the 500W rack and clean the attachment points with a bonding brush at both the 500W rack and the aircraft and reattach the rack to the rails in the panel. Verify the resistance between the mounting rack and nearby exposed portion of aircraft metallic structure is less than 2.5 milliohms.

4. Reinstall the backplate assembly and reinstall the 500W in the mounting rack.

2.5.4.2 GNS 500W Series Unit in Composite Aircraft

Perform an electrical bonding check as follows:

1. Remove the 500W unit from the mounting rack.
2. Remove the backplate assembly from the rack.
3. Measure the resistance between the mounting rack and the instrument panel, verify it is less than 10 milliohms.

   In the event of bonding test failure, remove the 500W rack and clean the attachment points with a bonding brush at both the 500W rack and the aircraft and reattach the rack to the rails in the panel. Verify the resistance between the mounting rack and the instrument panel is less than 5 milliohms.

4. Reinstall the backplate assembly and reinstall the 500W in the mounting rack.

2.5.4.3 Flight Stream 210 in Metallic or Tube/Fabric Aircraft

1. Disconnect the shield terminations from the Flight Stream 210 connector backshell.
2. Measure the resistance between the connector and nearby exposed portion of aircraft metallic structure and verify that it is less than or equal to 20 milliohms.

   In the event of bonding test failure, remove the Flight Stream 210 connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. Re-attach the bonding strap to the aircraft ground plane, torque to 12-15 in-lbs. Verify the resistance between the Flight Stream 210 connector and aircraft structure is less than or equal to 10 milliohms. If cleaning the far side of the strap is not enough, remove, clean, and re-attach the Flight Stream 210 side.

3. Connect the shield terminations to the Flight Stream 210 connector backshell.

2.5.4.4 Flight Stream 210 in Composite Aircraft

1. Disconnect the shield terminations from the Flight Stream 210 connector backshell.
2. Measure the resistance between the connector and instrument panel (or other aircraft ground) and verify that it is less than or equal to 20 milliohms.

   In the event of a bonding test failure, remove the Flight Stream 210 connector bonding strap from the aircraft ground plane and clean the attachment point with a bonding brush. Re-attach the bonding strap to the aircraft ground plane, torque to 12-15 in-lbs. Verify the resistance between the Flight Stream 210 connector and aircraft ground is less than or equal to 10 milliohms. If cleaning the far side of the strap is not enough, remove, clean, and re-attach on the Flight Stream 210 side.
3. Connect the shield terminations to the Flight Stream 210 connector backshell.

2.6 Troubleshooting Information

If error indications are displayed on the 500W series unit, consult the Troubleshooting section contained in the 500W Series Installation Manual, listed under reference documentation in paragraph 2.1 of this document. The same troubleshooting section also contains troubleshooting information for the Flight Stream 210. The '500W Series Post-Installation Checkout Log' in the aircraft permanent records includes the configuration information for the installation. (See Section 5 in the 500W Series Installation Manual for a sample Log).

2.7 Removal and Replacement Information

2.7.1 GNS 500W

If the 500W series unit is removed and reinstalled, verify that the 500W series unit power-up self-test sequence is successfully completed and no failure messages are annunciated.

If the 500W series unit is removed for repair and reinstalled, or if the 500W unit is removed and replaced with a different 500W series unit, then follow 'Post Installation Configuration & Checkout Procedures' contained in the 500W Series Installation Manual listed in Section 2.1 of this document, and verify the 500W unit power-up self-test sequence is successfully completed and no failure messages are annunciated.

If any work has been done on the aircraft that could affect the system wiring, antenna cable, or any interconnected equipment, verify the 500W series unit power-up self-test sequence is successfully completed and no failure messages are annunciated.

To remove the 500W series unit from the mounting rack, insert a 3/32-inch hex drive tool into the access hole at the bottom of the unit face. Rotate the hex tool counterclockwise until the unit is forced out about 3/8 inches and can be freely pulled from the rack.

The 500W unit is installed in the rack by sliding it straight in until it stops, about 1 inch short of the final position. Insert the hex drive tool into the access hole at the bottom of the unit face. Rotate the hex tool clockwise while pressing on the left side of the bezel until the unit is firmly seated in the rack.

Note: There are no special handling requirements for the 500W series units.

2.7.2 Flight Stream 210 (If Installed)

See Figure 1 when performing the following steps:

Removal

1. Locate and open the BT Link circuit breaker.
2. Unscrew the two jackscrews on the Flight Stream 210 connector. Remove connector.
3. Remove the four #6 mounting screws to remove the Flight Stream 210.

Reinstallation

1. Check that the BT Link circuit breaker is open.
2. Reinstall the Flight Stream 210 using the four previously removed #6 mounting screws.
3. Tighten fasteners until snug, plus an additional 1/4 turn.

Note: *Ensure that the Flight Stream 210 is mounted with the arrow pointing in the direction of flight.*

4. Attach the connector, tightening the two jackscrews.
5. Close the BT Link circuit breaker.
6. Complete the interface checkout procedures contained in Section 5.5.8 of the 500W Series Installation Manual.

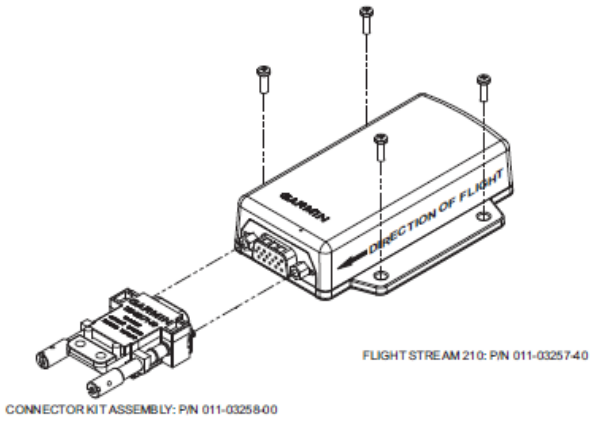

Figure 1. Flight Stream 210 Assembly Overview (Bonding Strap Not Shown)

2.7.3 Flight Stream 210 Bonding Strap

The following removal and replacement steps are provided as guidance for replacing the Flight Stream 210 bonding strap. The bonding strap assembly drawing is shown in Figure 2.

Note: *Aircraft structure side of bonding strap may be mounted using a nut in lieu of a nut plate. If a nut was used in lieu of a nut plate, further disassembly of the aircraft may be required to gain access to the nut.*

Removal

1. Disconnect one end of the bonding strap from the aircraft ground location.
2. Disconnect the other end of the bonding strap from the shield block on the Flight Stream 210 connector backshell.
3. Remove the bonding strap.

Replacement

Note: *The Flight Stream 210 bonding strap should be as short as practical. When installed, the bonding strap must not loop back on itself.*

1. Construct a bonding strap no longer than 20” by attaching clean terminal lugs to both ends of clean braid (see Table 1 for parts required).
2. Clean the attachment locations with a bonding brush.
3. Secure each end of the bonding strap to the previously installed locations. Ensure that the strap does not loop back on itself and that the hardware is as shown in Figure 2. The washers must seat fully against the aircraft metallic structure without overhang or interference with other hardware.
4. Using a milliohm meter, verify that the resistance between the connected structure is less than 10 milliohms.

   In the event of a bonding test failure, remove the bonding strap from the aircraft ground point and clean the attachment points with a bonding brush. Re-install the bonding strap and perform the electrical bonding test in accordance with Section 2.5.4.
5. Replace any damaged hardware, otherwise hardware may be reused.

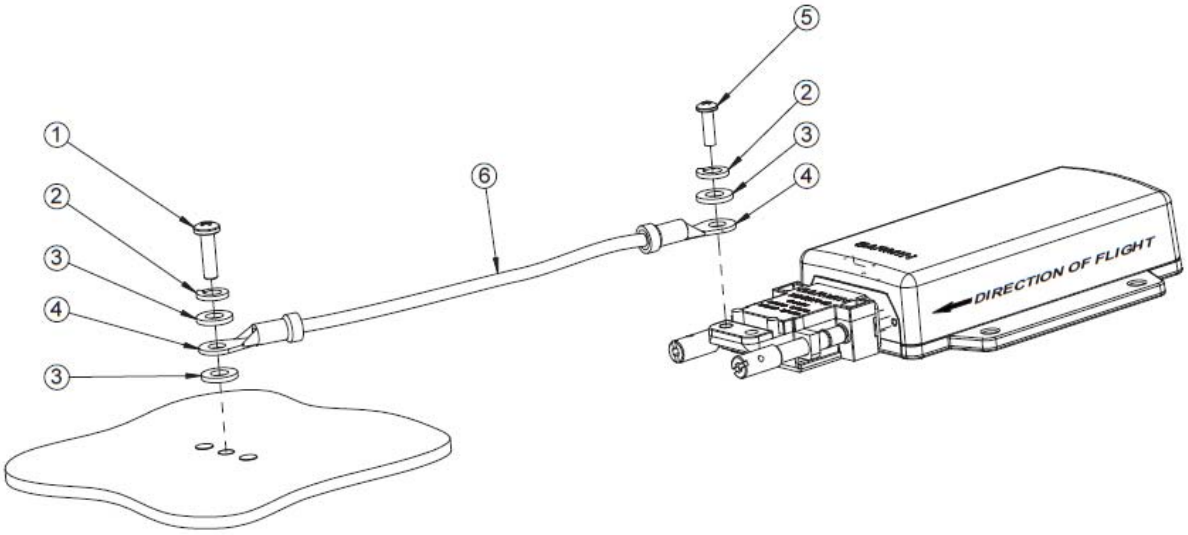

Figure 2. Flight Stream 210 Bonding

Table 1. Flight Stream 210 Bonding Hardware

See Figure 2	Hardware	P/N
1	Screw	MS35206 (AN515) #8 Pan Head Screw
2	Lock Washer	MS35338-42 #8 Lock Washer
3	Flat Washer	NAS1149FN832P (AN960C8) #8 Washer
4	#8 Ring Terminal	MS25036 #8 Ring Terminal
5	Screw	MS51957-42 #6 Screw
6	Braid	QQB575R36T0250 or larger

2.8 Diagrams

Refer to the 500W Series Installation Manual (listed under reference documentation in section 2.1 of this document) for drawings applicable to this installation. Point to point wiring diagrams are in Appendix H of the 500W Series Installation Manual. Refer to the GNS 500W Series Post-Installation Checkout Log retained in the aircraft permanent records for a list of the interfaced equipment. The antenna cables are routed between the 500W series unit and the antenna with disconnects at each unit. The antenna cable typically is routed behind interior panels in the fuselage.

2.9 Special Inspection Requirements

None, N/A.

2.10 Application of Protective Treatments

None, N/A.

2.11 Data Relative to Structural Fasteners

None, N/A.

2.12 Special Tools

A milliohm meter with an accuracy of +/- 0.1 milliohms ohms (or better) is required to measure the electrical bonding between the 500W system components and aircraft ground.

No special tools are required for system checkout. See 500W Series Installation Manual listed in reference documentation in section 2.1 of this document.

2.13 Additional Instructions

None.

2.14 Overhaul Period

The system does not require overhaul at a specific time period. Power on self-test and continuous BIT will monitor the health of the 500W series unit. If the unit indicates an internal failure, the unit may be removed and replaced. See troubleshooting section contained in the 500W Series Installation Manual, listed under reference documentation in section 2.1 of this document.

2.15 ICA Revision and Distribution

To revise this ICA, Garmin will follow the Garmin ODA Procedures Manual SOP-0055/ACP-0016 for Instructions for Continued Airworthiness. The latest revision of this ICA document is available on the Garmin Dealer Resource Center (www.garmin.com). A Garmin Service Bulletin describing ICA revision will be sent to Garmin dealers if a revision is determined to be significant.

2.16 Assistance

Flight Standards Inspectors or the certificate holder's PMI have the required resources to respond to questions regarding this ICA. In addition, the customer may refer questions regarding this equipment and its installation to the manufacturer, Garmin. Garmin customer assistance may be contacted during normal business hours via telephone 913-397-8200 or email from the Garmin web site at www.garmin.com.

2.17 Implementation and Record Keeping

Modification of an aircraft by this Supplemental Type Certificate obligates the aircraft operator to include the maintenance information provided by this document in the operator's aircraft maintenance manual and/or the operator's aircraft scheduled maintenance program.